# STAT 453/553: Introductory Biostatistics Syllabus
# Spring 2019

**Overview**

This course provides an overview of statistical methodology useful in the practice of modern biostatistics. There are two major topics covered in the course at an introductory level: biostatistics for epidemiology and clinical trial design. More specific topics are listed in the attached daily syllabus.

**Time: Tuesday and Thursday 4:15pm – 5:30 pm**

**Location: Room 285, BioScience Research Collaborative (BRC), Rice University**
6500 Main Street, Houston, TX 77030-1402

**Instructors:** There are two instructors for the course. Each instructor will cover about 7 weeks of the course. Dr. Suyu Liu will cover biostatistics, and Dr. Ying Yuan will cover clinical trials.


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|---|---|---|
| **Instructor:** | Ying Yuan | Suyu Liu |
| **Email:** | yyuan@mdanderson.org | syliu@mdanderson.org |
| **Voice:** | 713-563-4271 | 713-563-4280 |
| **Location:** | FCT4.6034 @ MDA Pickens Towers | FCT4.6032@ MDA Pickens Towers |
| **OfcHrs:** | By Appt | By Appt |


**Teaching Assistant**: TBD

**Textbooks:** **Statistics for Epidemiology**, by Nicholas Jewell. Publisher: Chapman & Hall/CRC

**Homework:** Each of the two major parts will include approximately 2-3 assignments, at least one of which will be data based. All students are required to complete the assignments. Homework will be submitted at the beginning of class on the due date. If circumstances beyond the student's control arise and an assignment cannot be submitted on the due date, an instructor should be contacted prior to the due date. With an instructor's permission, late homework may be accepted within one week of the due date. All decisions will be made on an individual student basis and the final decision rests with the instructor assigning the homework. **A penalty of 10 percentage points will be applied to late homework.**

**Website:** http://odin.mdacc.tmc.edu/~yyuan/ has more information about the Biostatistics part of the course and datasets for the homework.

**Examinations:** There will be one in-class midterm exam and one final project in the course.

**Course Grade and STAT 453 vs 553**

The material covered in the classroom serves two different course, STAT 453 (undergraduate) and 553 (graduate). Although the lectures will cover the same material for both courses, those enrolled in STAT 553 will be required to answer either additional questions or more challenging questions on the both the homework assignments and in-class exam. Although the requirements for the two courses are the same, different grading scales will be applied to the two courses according to their relative level. Both courses will be graded on the following component basis.

| Component | % |
|---|---|
| Homework | 40 |
| Exam and final project | 60 |

**Disability Statement**

Any student with a disability requiring accommodations in this course is encouraged to contact me after class or during office hours. Additionally, students will also need to contact Disability Support Services in the Ley Student Center.

**TENTATIVE DAILY SYLLABUS**

| Week | Date | Topic | Readings* | Notes | Instructor |
|---|---|---|---|---|---|
| 1 | 1-8-T | Introduction | | Overview the course | Liu |
| | 1-10-Th | Study Design | SE: 3, 5 | Cohort, case-control and observational studies | Liu |
| 2 | 1-15-T | Disease-Exposure Association | SE: 4 | Risk, odds, odds ratio, relative risk, standard errors | Liu |
| | 1-17-Th | Contingency Tables: Association | SE: 6 | Chi-square test | Liu |
| 3 | 1-22-T | Contingency Tables: Confounding | SE: 9 | Mantel-Haenszel test | Liu |
| | 1-24-Th | Contingency Tables: Interaction | SE: 10 | Test of homogeneity | Liu |
| 4 | 1-29-T | Logistic Regression: introduction | SE: 12 | Including review of maximum likelihood estimation | Liu |
| | 1-31-Th | Logistic Regression: estimation | SE: 13 | Interaction | Liu |
| 5 | 2-5-T | Logistic Regression: diagnosis | SE: 13 | | Liu |
| | 2-7-Th | **Spring Recess** | | **No class** | |
| 6 | 2-12-T | Matched studies | SE: 16 | | Liu |
| | 2-14-Th | Matched studies | SE: 16 | | Liu |
| 7 | 2-19-T | **Study day** | | | Liu |
| | 2-21-Th | **Midterm Exam** | | **In class exam** | Liu |
| 8 | 2-26-T | Introduction to clinical trials and Bayesian statistics | | | Yuan/Liu |
| | 2-28-Th | Introduction to clinical trials and Bayesian statistics | | | Yuan/Liu |
| 9 | 3-5-T | 3+3 design and CRM | | | Yuan |
| | 3-7-Th | 3+3 design and CRM | | | Yuan |
| 10 | 3-12-T | **Spring Break** | | **No class** | Yuan |
| | 3-14-Th | **Spring Break** | | **No class** | Yuan |
| 11 | 3-19-T | Bayesian optimal interval design | | | Yuan |
| | 3-21-Th | Handle Late-onset toxicity | | | Yuan |
| 12 | 3-26-T | Drug combination trials | | | Yuan |
| | 3-28-Th | Drug combination trials | | | |
| 13 | 4-2-T | Phase II trial design | | | Yuan |
| | 4-4-Th | Phase I/II trial design | | | Yuan |
| 14 | 4-9-T | Phase I/II trial design | | | Yuan |
| | 4-11-Th | Final project presentation | | | Yuan |
| 15 | 4-16-T | Final project presentation | | | Yuan |
| | 4-18-Th | Final project presentation | | | Yuan |

*SE: Statistics for Epidemiology textbook